

**Claims:**

1. A capless holding device comprising a cylinder for holding a medium that is movable between a projected position and a housed position, the cylinder comprising a tip opening out of which a tip of the medium located at the projected position to be projected and a housing section for sealing the tip of the medium located at the housed position, the capless holding device comprising:

a rotor connected to the cylinder so as to relatively rotatively movable;  
an engaging projection provided on the medium; and,  
a cam groove formed on the rotor to guide the engaging projection forward and backward in unison with rotation of the rotor,

wherein a guide groove is formed on the cylinder to guide the engaging projection in a rotating direction, and the cam groove, the guide groove and the engaging projection cooperate with one another in retracting the medium from the projected position, rotating the medium, and then advancing the medium to the housed position and in retracting the medium from the housed position, rotating the medium, and then advancing the medium to the projected position.

2. The capless holding device according to claim 1, wherein said cam groove is V-shaped and comprises a first cam groove and a second cam groove which are inclined in opposite directions relative to an axial direction, said guide groove is U-shaped and comprises a first guide groove substantially parallel with the axial direction, a second guide groove substantially extending in a circumferential direction, and a third guide groove substantially parallel with the axial direction, and the engaging projection can take the projected position when positioned in the first cam groove and in the first guide groove and can take the housed position when positioned in the second cam groove and in the third guide groove.

3. The capless holding device according to claim 2, wherein a junction between said first guide groove and said second guide groove crosses said first cam groove in front of a top portion of the V-shaped cam groove, and a junction between said

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third guide groove and said second guide groove crosses said second cam groove in front of the top portion of the V-shaped cam groove.

4. The capless holding device according to claim 2, wherein said second guide groove has a small first inclined portion and a small second inclined portion both of which are inclined in the axial direction and a transverse guide groove between the first inclined portion and the second inclined portion, and the transverse guide groove can cross the top portion of the V-shaped cam groove.

5. The capless holding device according to claim 3, wherein said second guide groove has a small first inclined portion and a small second inclined portion both of which are inclined in the axial direction and a transverse guide groove between the first inclined portion and the second inclined portion, and the transverse guide groove can cross the top portion of the V-shaped cam groove.